• $\omega_0^2 = \frac{1}{LC} \Rightarrow C = \frac{1}{L\omega_0^2} = \frac{1}{25.10^6.10^{-3}} = 4.10^{-5}F$

C=4.10^{-5}F

• $Q_m = CU_0 \Rightarrow U_0 = \frac{Q_m}{C} = \frac{0,4.10^{-3}}{4.10^{-5}} = 10V$

U_0=10V

5°)

a- $q = Q_m \sin(\omega_0 t + \varphi)$

$i = \omega_0 Q_m \cos(\omega_0 t + \varphi)$

$\sin^2(\omega_0 t + \varphi) = \left(\frac{q}{Q_m}\right)^2$

$\cos^2(\omega_0 t + \varphi) = \left(\frac{i}{\omega_0 Q_m}\right)^2$

$\Rightarrow \left(\frac{q}{Q_m}\right)^2 + \left(\frac{i}{\omega_0 Q_m}\right)^2 = 1 \Rightarrow i^2 = \omega_0^2(Q_m^2 - q^2)$

b- **q=2.10^{-4}C**

$i^2 = \omega_0^2(Q_m^2 - q^2)$

$= 25.10^6(16.10^{-8} - 4.10^{-8})$

$\Rightarrow i = \pm\sqrt{3}A$

6°)

a- $q(t) = 4.10^{-4}\sin(5.10^3 t + \frac{\pi}{2})$

Car à t=0s q=$Q_m \Rightarrow \sin(\varphi) = 1 \Rightarrow \varphi = \frac{\pi}{2}$

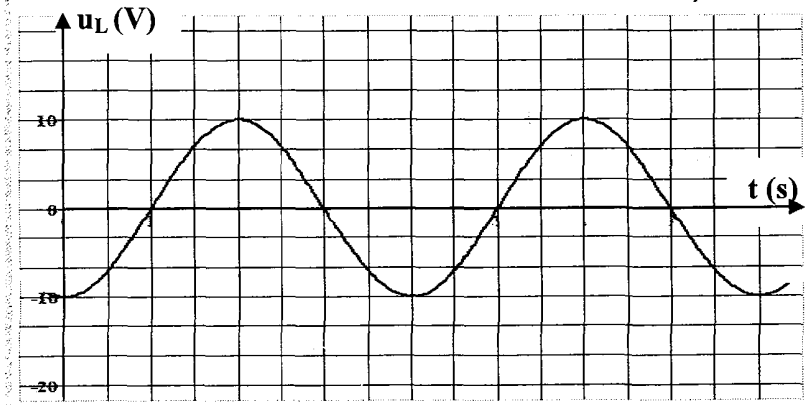
$i(t) = 2.\sin(5.10^3 t + \pi)$ car

$i(t) = I_m\cos(\omega_0 t + \varphi) = I_m\sin(\omega_0 t + \varphi + \frac{\pi}{2})$

b- $u_L + u_C = 0 \Rightarrow u_L = -u_C$

$\Rightarrow u_L = -\frac{q}{C} = -\frac{1}{C}(4.10^{-4}\sin(5.10^3 t + \frac{\pi}{2})$

$= -\frac{4.10^{-4}}{4.10^{-5}}\sin(5.10^3 t + \frac{\pi}{2})$

$= -10\sin(5.10^3 t + \frac{\pi}{2}) = 10\sin(5.10^3 t + \frac{\pi}{2} + \pi)$

$= 10\sin(5.10^3 t + \frac{3\pi}{2})$